

# Two New Species of *Hortia* (Rutaceae) from Amazonia

Milton Groppo and José R. Pirani

Instituto de Biociências, Universidade de São Paulo, Caixa Postal 11461-05422-970,  
São Paulo, Brazil. groppojr@yahoo.com.br

**ABSTRACT.** *Hortia nudipetala* Groppo and *H. vandelliana* Groppo (Rutaceae, Toddaliioideae, Toddaliinae) from Amazonia are described and illustrated. The first species is known from the sandy, periodically inundated margins of tributaries of the upper Rio Negro, and the second from Brazilian and Venezuelan Amazonia. Comments on affinities of the two species, geographic distribution, and phenology are provided.

**RESUMO.** *Hortia nudipetala* Groppo e *H. vandelliana* Groppo (Rutaceae, Toddaliioideae, Toddaliinae) da Amazônia são descritas e ilustradas. A primeira espécie é conhecida das margens arenosas e periodicamente inundadas dos tributários do alto Rio Negro e a segunda da Amazônia Brasileira e Venezuelana. São apresentados comentários sobre as afinidades, distribuição geográfica e fenologia das duas espécies.

**Key words:** Amazonia, Brazil, *Hortia*, Rutaceae.

*Hortia* Vandelli is a Neotropical genus of Rutaceae traditionally included in subtribe Toddaliinae, subfamily Toddaliioideae (see Engler, 1931). The 10 species are distributed from Panama to the state of São Paulo in Brazil, but most occur across Amazonia. These taxa are trees or shrubs with simple leaves crowded near the apex of the branches and have showy, wide corymbose terminal inflorescences, red to pink flowers, and a baccate fruit with abundant oil glands. During a study aimed at a revision of the genus, two new species were recognized.

The descriptions are based only on collections from mature individuals. Flowers and fruits of herbarium specimens were rehydrated before being measured and drawn. The terminology for shapes of leaves and other organs follows Hickey (1979) and Radford et al. (1974); for inflorescences, Weberling (1989); and for fruit, Spuji (1994).

***Hortia nudipetala*** Groppo, sp. nov. TYPE: Brazil.

Amazonas: São Gabriel da Cachoeira, alto Rio Negro, Rio Uaupés, Igarapé Tubuari, acima do Seringal Pago, 22 Nov. 1987 (fl), *H. C. de Lima, M. L. Kawasaki, J. Ramos & R. P. de Lima* 3278 (holotype, SPF; isotypes, INPA, NY, RB). Figure 1.

Ab omnibus speciebus generis petalis glabris distincta. Species *H. brasilianae* similis, sed foliis angustioribus distincte petiolatis atque nervo inframarginali manifesto difert.

Shrub 2–3 m tall; diameter of trunk unknown; branches erect, glabrous; outer bark scarcely fissured, the inner bark pale yellow. Leaves chartaceous, patent to ascending, glabrous, petiolate; blade 15.8–24.1 × 2.9–3.6 cm, with abundant pellucid dots, apparently lustrous on adaxial surface, dull on abaxial surface, narrowly oblong to lanceolate, apex rounded, acute or retuse, apiculate or not, margin entire, revolute, thickened, base attenuate; midrib thick, flat on the adaxial surface, prominent below, the secondary veins in 18 to 22 pairs diverging from midrib at 55°–64°, prominent on both faces, united in an evident inframarginal vein, the tertiary veins prominent on both faces; petiole 1.4–3 cm long, clearly distinct from blade, winged, thickened at base. Inflorescence a pleiothyrroid, 5–7 × 7–8 cm, the branches slightly complanate, minutely fissured transversely; bracts and bracteoles triangular, the proximal ones 1 × 3 mm, not crowded at base of inflorescence, the distal ones ca. 1 × 1 mm; thickness of the axis 0.5 cm at base, 0.2 cm after the 4th order of ramification; pedicels ca. 2 mm long. Flowers 5-merous, ca. 7–8 mm diam.; buds ovoid; calyx cotyloform, 5-lobed, the lobes triangular, ca. 1.4 mm long, obtuse or acuminate, ciliate; petals 5, pink, oblong to triangular, ca. 6 × 2.5 mm, apiculate, glabrous; filaments ca. 3–5 × 1 mm, inserted on the apex or side of the disc; anthers ca. 1.5 mm long, oblong; disc cotyloform, 5-lobed, fleshy, adnate to a very short gynophore; gynoecium ovoid, ca. 5 × 2 mm, the base immersed in the disc; ovary 5-lobed, slightly raised upon the gynophore; style conical, ca. 1 mm long. Fruit (immature) a globose berry, ca. 6 × 6 mm, green; seeds (mature) not seen.

**Distribution and habitat.** *Hortia nudipetala* is known so far by only a few collections made in the region of the upper Rio Negro, in the vicinity of São Gabriel da Cachoeira, state of Amazonas, Brazil (Fig. 3). It was found on the periodically inundated margins of some tributaries of the Rio Negro

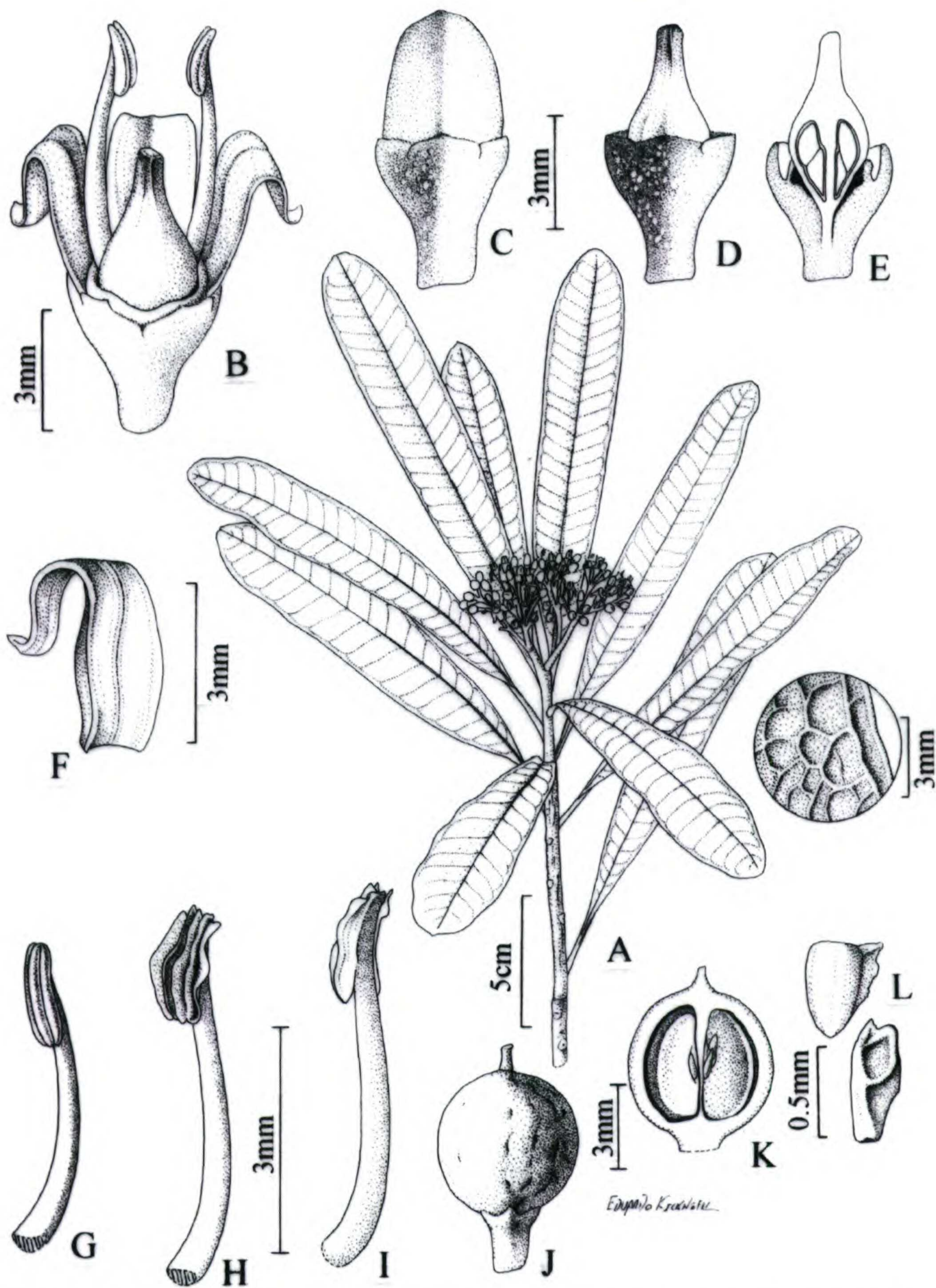


Figure 1. *Hortia nudipetala* Groppo. —A. Habit with detail of the venation and inframarginal vein on the abaxial surface of the leaf. —B. Flower. —C. Bud. —D. Gynoecium. —E. Gynoecium in longitudinal section. —F. Petal. —G. Stamen. —H. Stamen with open thecae. —I. Same in abaxial view. —J. Immature fruit; note the remnant of the style. —K. Immature fruit in longitudinal section. —L. Two ovules, the lower one aborted. A–I and L from Lima *et al.* 3278; J, K from Schultes & López 9687.

(such as the Uaupés River) and along some igarapés (small, black-water rivers) on sandy soils, in campina (an open vegetation of low trees and shrubs). Specimens were collected with flowers in November and January to March, and with immature fruits in March.

*Hortia nudipetala* is the only species in the genus where the petals are totally devoid of the characteristic trichomes that otherwise occur on the adaxial surface of the petals. It is similar to *H. brasiliana* Vandelli ex DC. (an arborescent species of the Atlantic coast of Brazil), in particular because of the flowers, i.e., with similar shape of the ovary and stamens; however, the leaves of *H. nudipetala* are narrower (to 3.6 cm vs. 3–9(–11) cm in *H. brasiliana*) with an evident inframarginal vein, and the petiole is more distinct. In addition, the two species are largely allopatric.

No economic uses or common names are reported for this species.

**Paratypes.** BRAZIL. **Amazonas:** São Gabriel da Cachoeira, Rio Negro, Igarapé Toury (Tubuari), R. L. Fróes 27916 (IAN); Igarapé Tuari (Tubuari), lado oposto à Ilha de Aparecida, W. A. Rodrigues 10878 (NY); Rio Uaupés, Taracua, R. E. Schultes & F. López 9687 (GH, MO).

***Hortia vandelliana*** Grosso, sp. nov. TYPE: Brazil. Amazonas: São Paulo de Olivença, alto Rio Solimões, platô ao sul da cidade, estrada para a localidade de Bom Fim, 25 Nov. 1986 (buds), C. A. Cid et al. 8538 (holotype, SPF; isotypes, HAMAB, INPA 2 sheets, NY). Figure 2.

Species foliis *H. coccinae* comparabilis, sed petalis triangularibus, alabastris ovatis atque petalis trichomatibus majoribus differt. *H. brasilianae* etiam similis, sed alabastris fructibusque minoribus atque foliis nervis non manifestis differt.

Tree or shrub (2–)4–20 m tall, trunk up to 60 cm diam.; branches erect, glabrous; outer bark scarcely fissured, the inner bark pale yellow. Leaves chartaceous to strongly coriaceous, patent to ascending, glabrous, petiolate; blade 10–22.2 × 4.1–7.2 cm, with abundant pellucid dots, apparently lustrous on adaxial surface, dull on the abaxial surface, obovate, the apex rounded, seldom retuse, the margin entire, revolute, thickened, the base attenuate to decurrent; midrib thick, flat on the adaxial surface, prominent below, the secondary veins in 10 to 12 pairs diverging from midrib at 35°–53°(60°), immersed in the mesophyll on both faces, usually not visible on the abaxial surface, not united in an inframarginal vein, the tertiary veins not visible on both surfaces, immersed in the mesophyll; petiole 1.2–2(–3) cm long, sometimes not

clearly distinct from blade, winged, thickened at base. Inflorescence a pleiothyrsoid, 9–13 × 6–11 cm, the branches terete, minutely fissured transversely; bracts and bracteoles triangular, the proximal ones ca. 3 × 5 mm, not crowded at base of inflorescence, the distal ones ca. 0.5 × 1 mm, ciliate; thickness of the axis 0.6–0.7 cm at base, 0.2 cm after the 4th order of ramification; pedicels ca. 1.5 mm long. Flowers 5-merous, ca. 8 mm diam.; buds ovoid; calyx cotyliform, 5-lobed, the lobes triangular, ca. 1.4 mm long, obtuse or acuminate, not ciliate; petals 5, pink, triangular, ca. 4 × 2.5 mm, apiculate, with a tuft of trichomes on the base of the adaxial face, the trichomes straight, 0.5–0.9 mm long; filaments ca. 4 × 0.9 mm, inserted on the apex of the disc; anthers ca. 2.5 mm long, oblong; disc cotyliform, 5-lobed, fleshy, adnate to a short gynophore; gynoecium ovoid, ca. 3 × 2 mm, the base immersed in the disc; ovary slightly 5-lobed, raised upon the gynophore; style conical, ca. 1 mm long. Fruit an ellipsoid berry, ca. 3.5 × 2.5 cm, green or light yellow when mature; seeds conical, ca. 8 × 6 mm, the testa blackened, the hilum basal; cotyledons 5–6 × 4 mm, oval.

**Distribution and habitat.** Two of the six specimens of *Hortia vandelliana* (the type collection and Silva et al. 532) have been collected in eastern Amazonas state, Brazil, where it occurs in the Rio Solimões basin, in Amazonian “caatinga” (arborescent vegetation on sandy soils), and in “terra firme” forest (non-inundated tall forest); another two collections (Ribeiro 1026 and Fróes 28029) are from river margins of the Rio Negro basin, on sandy or clay soils. There is one record from the department of Amazonas, Venezuela, and another from Curacaha range (600 m of altitude), state of Roraima, Brazil (Fig. 3). The species was collected with flowers in June and November, and with fruits in February, March, and July.

The shape, size, and nervation of the leaf blade of this species are similar to those of *Hortia coccinea* Spruce ex Engler. *Hortia vandelliana* differs from that species, however, by a petiole that is sometimes indistinct (vs. clearly distinct) from the blade, by smaller (8 mm vs. 14 mm diam.) flowers, and by the triangular (vs. oblong) petals bearing longer trichomes (0.5–0.9 vs. 0.2–0.3 mm) that are present just as tuft on the base of the (vs. the entire) adaxial surface.

The flowers of *Hortia vandelliana* are smaller than those of *H. brasiliana* (8 mm vs. 13 mm diam.), but similar in all other aspects. In *H. vandelliana* the secondary and tertiary veins are immersed in the leaf blade, while in *H. brasiliana*

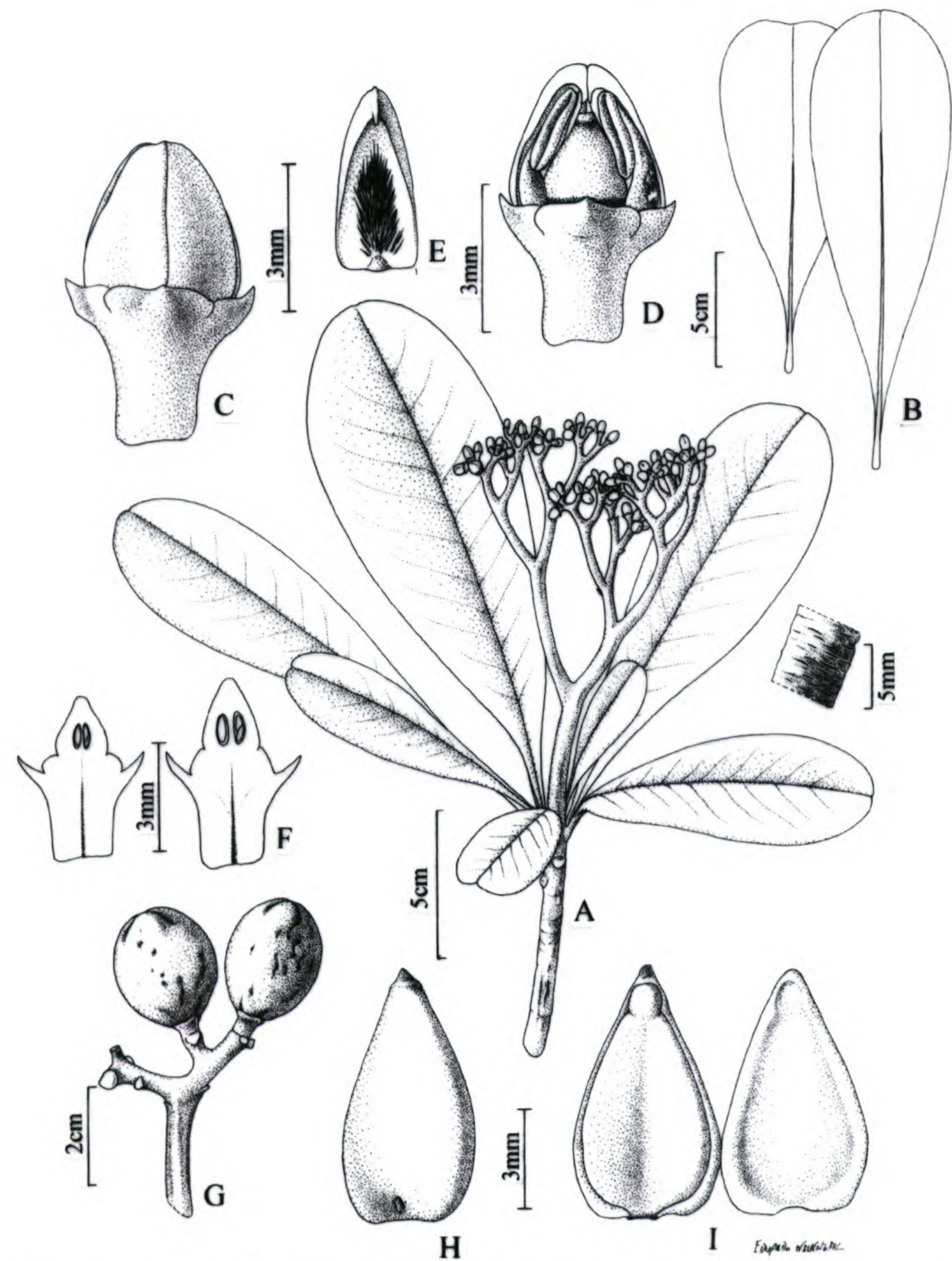


Figure 2. *Hortia vandelliana* Groppo. —A. Habit, with detail of the fissures in the axis of the inflorescence. —B. Leaves. —C. Bud. —D. Bud with two petals and two stamens removed. —E. Petal, adaxial view. —F. Gynoecium of two flowers in longitudinal section. —G. Fruits. —H. Seed. —I. Seed in longitudinal section, showing embryo (part of endosperm on the right). A, C–F from *Cid et al.* 8538; B, left leaf from *Silva et al.* 532, right leaf from *Murça-Pires et al.* 16945; G–I from *Murça-Pires et al.* 16945.

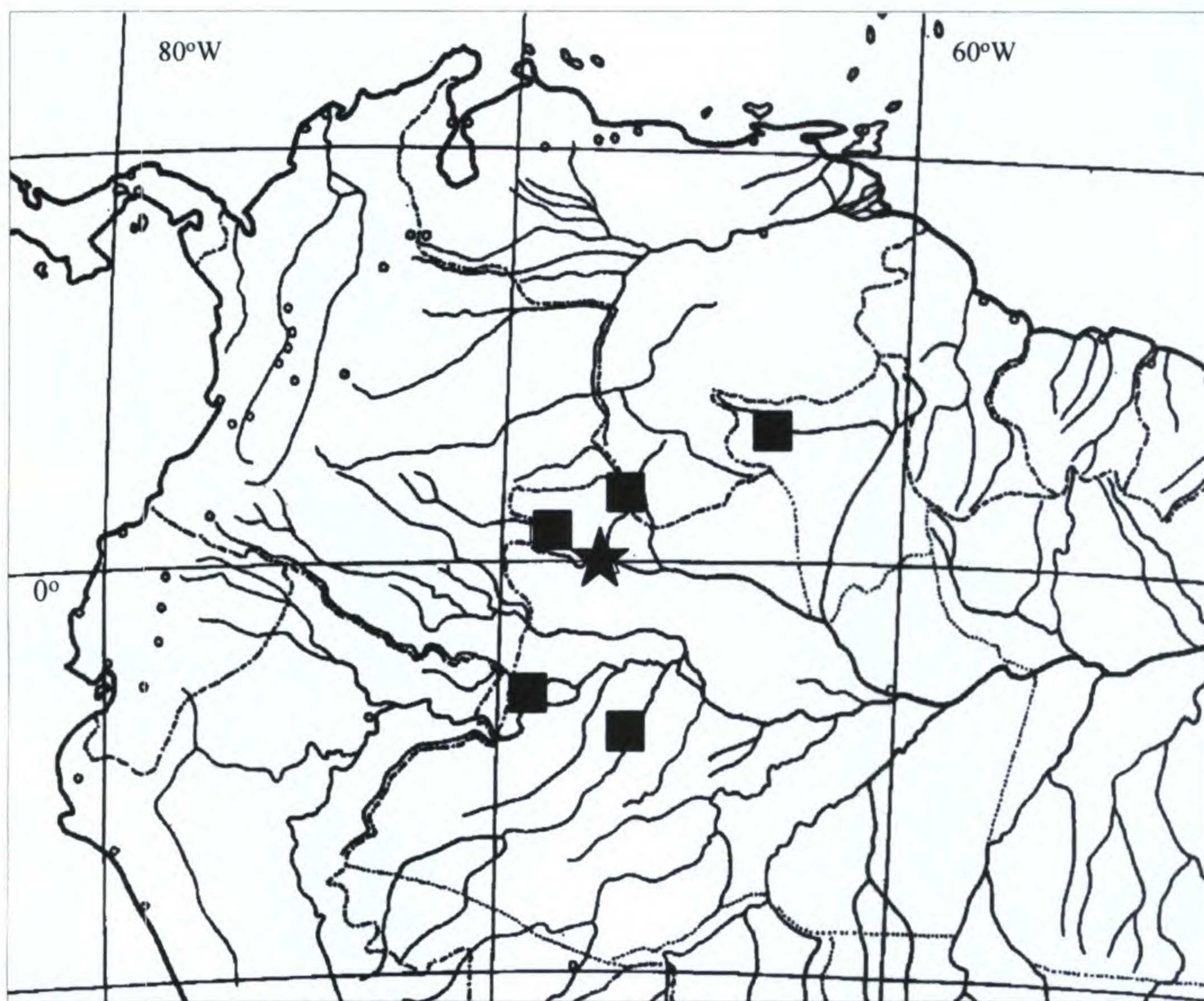


Figure 3. Known distributions of *Hortia nudipetala* (star) and *H. vandelliana* (squares) in Brazil and Venezuela.

they are evident and prominent. In *H. vandelliana* (vs. *H. brasiliana*) the secondary veins diverge from the midrib at less obtuse angles [ $35^{\circ}$ – $53^{\circ}$  ( $60^{\circ}$ ) vs.  $60^{\circ}$ – $69^{\circ}$ ] and the fruits are smaller (ca.  $3.5 \times 2.5$  cm vs.  $4.5$ – $5.5 \times 4.5$  cm in *H. brasiliana*) and globose to obovoid (vs. ellipsoid).

The specific epithet honors Domenico (Domingo or Domingos) Vandelli (1730–1816), Italian physician and botanist who described the genus *Hortia*.

No economic uses or common names are reported for this species.

**Paratypes.** BRAZIL. **Amazonas:** Carauari, Rio Juruá, Poço Juruá I, A. S. L. da Silva, N. A. Rosa & R. P. Bahia 532 (INPA); São Gabriel da Cachoeira, rio Içana, perto da cachoeira Malacacheta, R. L. Fróes 28039 (IAN); Iuareté, margem do rio Uaupés, B. G. S. Ribeiro 1026 (MG). **Roraima:** Rio Uraricoera, Serra Cura-ci-ha, J. Murça-Pires, W. A. Rodrigues, N. A. Rosa & G. Ranzani 16945 (INPA, MBM, MG). VENEZUELA. **Amazonas:** Guainía, along road from Maroa to Yabita, ca. 700 m from Yabita, P. Acevedo-Rodriguez, G. Aymard, P. E. Berry & R. Schargel 10285 (NY).

**Acknowledgments.** The first author thanks the curators of GH, HAMAB, IAN, INPA, MBM, MG,

MO, NY, and RB for the loan of specimens, and especially the curator of NY, for the gift of important collections of *Hortia* to SPF; Eduardo Kickhöfel for the illustration; and Jacquelyn Kallunki for both her helpful suggestions and improvements to the English text and her constant and enthusiastic help. Financial support from FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo, grant no. 00/07401-0) is duly acknowledged.

#### Literature Cited

- Engler, A. 1931. Rutaceae. Pp. 187–359 in A. Engler & K. Prantl (editors). Nat. Pflanzenfam. 2nd ed., Vol. 19a. Wilhelm Engelmann, Leipzig.
- Hickey, L. J. 1979. A revised classification of the architecture of dicotyledonous leaves. Pp. 25–39 in C. R. Metcalfe & L. Chalk (editors). Anatomy of the Dicotyledons, 2nd ed., Vol. 2. Clarendon Press, Oxford.
- Radford, A. E., W. C. Dickinson, J. R. Massey & C. R. Bell. 1974. Vascular Plant Systematics. Harper & Row, New York.
- Spjut, R. W. 1994. A systematic treatment of fruit types. Mem. New York Bot. Gard. 70: 1–181.
- Weberling, F. 1989. Morphology of Flowers and Inflorescences. Cambridge Univ. Press, Cambridge.